

INVITED ARTICLE

DIGITAL EQUITY: ISSUES AND MODELS

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WHAT DIGITAL EQUITY IS ALL ABOUT?

Digital equity is normally referred to as the quick, easy, and appropriately functional access to Information and Communications Technologies (ICT) equipment and tools (e.g. computers, telephones and the internet), as well as access to training to ensure effective access and use. The use of the word "access" is to highlight that ownership does not necessarily equate with use, and therefore, ownership of household ICT does not necessarily mean that all individuals within that household own or use the technology. This implies that the statistical figures on such matters must be interpreted with extra caution.

IS IT AN ISSUE?

ICT Penetration and Diffusion

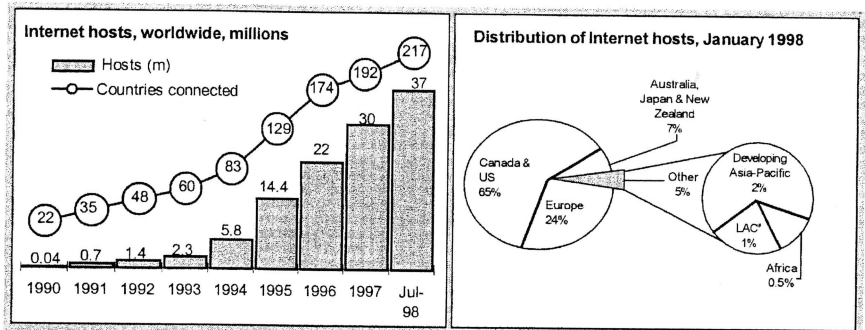
Based on the definition of digital equity as simply access to ICT equipment and tools, there obviously is digital inequity in a number of countries in the world. Although the number of internet hosts is growing, the majority of them are located in North America (Canada and US), followed by those in Australia, Japan and New Zealand. There were only 2 per cent of internet hosts located in the developing Asia Pacific region. See Figure 1 on the Worldwide Distribution of Internet Hosts below.

The number of personal computer (PC) ownership, internet users and ICT expenditure also indicate the existence of a digital gap between ASEAN and other developed countries. Figure 2 shows that more than half of the world's internet users are from the USA, despite the fact that the country's population is only just 4.7% of the total world population.

Figure 1
Worldwide Distribution of Internet Hosts

Internet Hosts: Growing but unequal Distribution

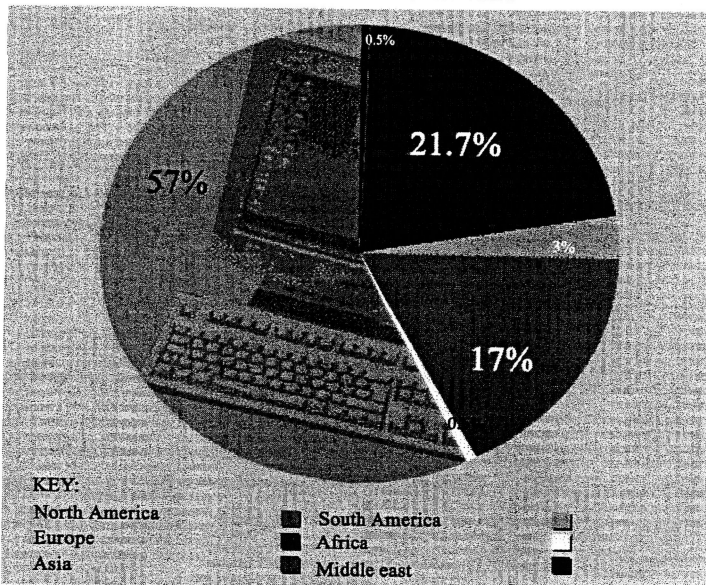
Installed base of Internet hosts, January 1991 - July 1998, and distribution by region, January 1998



* LAC = Latin America and the Caribbean

Source: ITU. Internet host data adapted from Network Wizards <<http://www.nw.com>> and RIPE <<http://www.ripe.net>>. Countries connected data sourced from Internet Society.

Figure 2
Internet Users Worldwide



Source: Nua Internet Surveys 1998.

In comparison, South Asia has more than 23% of the world's population yet it has less than 1% of the world's internet users. Singapore and Malaysia are amongst the most advanced ASEAN countries in ICT development whereas the new member countries of ASEAN are still lagging far behind. See Table 1.

Affordability Issues: More Than Just the Hardware and Software

It is actually rhetoric simply to talk about access to computers and the internet if such technology is not widely affordable, and if it is not being used effectively. Firstly, let us examine the affordability issue. The cost of hardware, phone lines, electricity, internet connection, software, and maintenance must be affordable to the people. This issue applies to individuals as well as organizations. Generally, the cost in terms of purchasing power parity, is fairly reasonable in Malaysia compared to other countries within the Southeast Asian region. In fact, many people can afford to buy PCs because of the availability of cheaper products and various forms of financial assistance. For instance, Diversified Resources Berhad (DRB) Hicom, a major player in the field, is offering PCs at only RM 1,800 per unit. The Employment Provident Fund (EPF) at one time resolved the affordability issue among the middle and lower income groups by allowing member withdrawals for the sole purpose of purchasing a home PC. Unfortunately, there are always people who cannot afford to update the necessary software and maintain the existing hardware. Inconvenience and maintenance costs are still high. People are still generally technically illiterate and therefore, have to pay a lot for technical services. Affordability then remains an issue for the majority of the population, especially the technically illiterate and less affluent groups.

A closer look at the spatial distribution of ICT within Malaysia would indicate that a digital gap still exists between urban and rural areas. The gap may get larger by the year 2005. See Table 2. According to a survey by the Information Technology Council (NITC), 83% of rural, and 60% of urban households still cannot afford to have basic internet PCs. PC cost takes a huge proportion of their average income, particularly amongst the Bumiputras ($\text{RM}3,000 / \text{RM}17,976 = 16.7$ per cent). Findings by IDC also indicate that PC costs constitute up to 20% of the average income of a Malaysian compared to only 3% in the US.

Table 1
ICT Diffusion, 2000

Country	PCs per 1000 pop (year 2000)	Internet users (‘000)	ICT exp (% of GDP)
Singapore	483.1	1,200	9.7
Malaysia	103.1	3,700	6.8
Thailand	24.3	2,300	3.6
Philippines	19.3	2,000	3.8
Indonesia	9.9	2,000	2.2
Vietnam	8.8	200	6.5
Lao PDR	2.6	6	Na
Myanmar	1.1	7	Na
US	585.2	95,354	8.1
UK	337.8	18,000	9.1
New Zealand	360.2	830	13.6
Japan	315.2	47,080	8.3

Source : ITU

Figure 3
Internet Service Cost as A Percentage of GDP, 2000¹

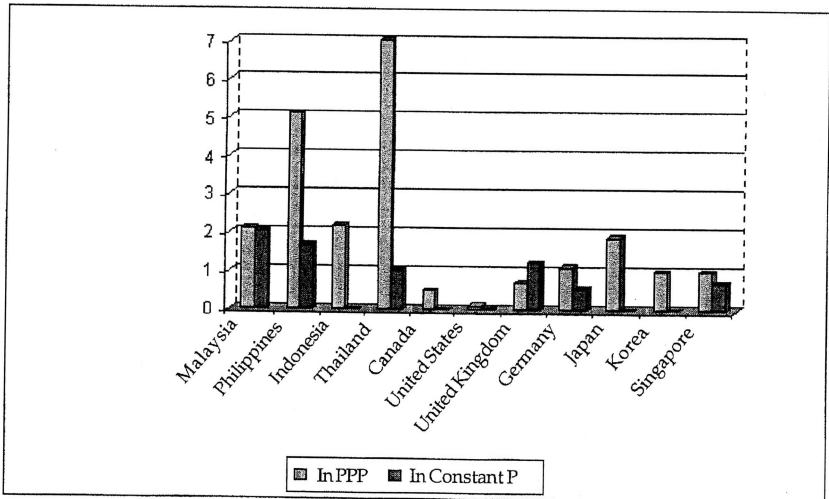


Table 2
Fixed Line Penetration (Per 100 population)

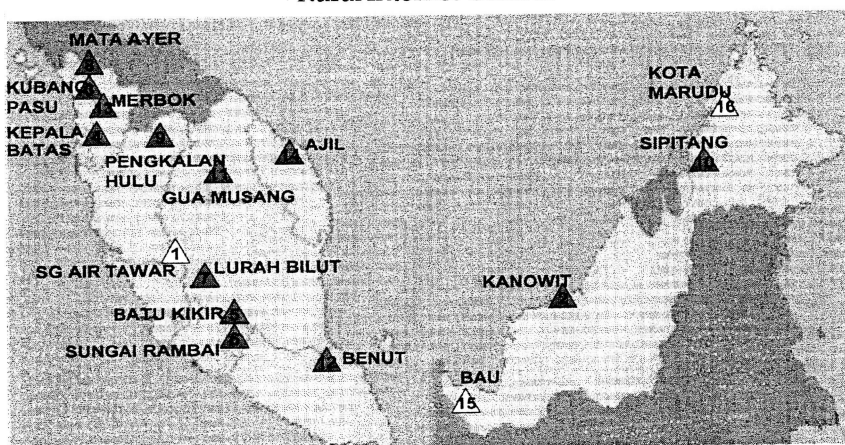
	1990	1995	2001	2003	2005
Location					
<i>Overall</i>	9.3	16.6	21.0	25.0	30.0
Urban	16.6	24.8	29.5	35.0	42.0
Rural	2.2	5.5	10.2	14.0	17.5
<i>Gap</i>	14.4	19.3	19.3	21.0	24.5

Source : MECM

There is also the need to address the infrastructure issue of digital equity. First is the RM 1 billion of government allocation and second is the RM1.1 billion targeted contribution by Telcos. There are 220 schools in Sabah and Sarawak which have benefited from government allocations in year 2002. There will be about 700 locations that will benefit from this programme in the year 2003.

The expected benefits of contributions from Telcos has yet to be seen, but the fund is expected to provide telecommunications facilities to underserved communities both in the rural and urban areas. This fund is managed by the Communications and Multimedia Commission of Malaysia (CMC).

Figure 4
Rural Internet Centres



Source: MECM

The other programme that has also been part of the concerted effort to bridge the digital divide is the Rural Internet Programme (RIP), which was launched in March 2000. A post implementation survey has shown that RIP improves internet penetration among rural folks. This project revolves around the issues of human development, provision of information infrastructure, and appropriate applications. As at the end of the year 2001, a total of 14 locations have been developed as Internet Village Centres in the states of Selangor, Sarawak, Kedah, Penang, Negeri Sembilan, Malacca, Pahang, Perlis, Perak, Sabah, Kelantan and Johor. See Figure 4 on the location of rural internet centres in Malaysia.

In the pilot projects, each centre is provided with 2 units of PC with internet access, and a printer. The development of portals and websites has changed the way the rural folks work, learn and live. Now the internet provides them a gateway to digital opportunities; through easy and instant access to local and global information content they are now in a position to enhance their economic status. It is anticipated that eventually, the rural folks will transact on-line as they embrace more and more of what the internet has to offer. The Second (2001-2002) and Third (2003-2005) Phases of the Expansion Programme will involve the installation of new infrastructure facilities in the designated rural internet centres.

There are other similar programmes by the Ministry of Rural Development, MIMOS, State Governments and Non-Governmental Organisations (NGOs). Desa Wawasan (1996) of MRRD, for example provides computer facilities to assist in the management and administration of villages to the Village Development and Security Committee (JKKK), and 995 villages have benefited from the programme by the end of 2000.

Another interesting effort in the quest for digital equity is the Mobile Internet Unit (MIU) project by MIMOS. A 44-seater fully wired bus provides ICT training and electronic classroom experience to school students, particularly in the rural areas. Students and teachers and in some cases, community members will have the opportunity to use computers (basic skills), multimedia software, basic internet services, and even learn how to create software. Another interesting development is that, a computer is also given to each school visited by the MIU. This goes a long way in helping to promote empowerment for the locals. To date, there are 20 schools under this project, most of which prior to their participation, did not have internet access².

The Smart School Programme by the Ministry of Education is a nationwide effort to provide equal access to learning, and to increase participation of all stakeholders such as parents, the community and the private sector in the E-learning transformation process. At the pilot stage, 90 schools have been selected as the beneficiaries. These comprise primary and secondary schools of which 38 are secondary schools, 5 are secondary religious schools, 38 are residential schools and the remaining 9 are new schools. The smart school curricula will cover the following four subject areas: namely, Science, Mathematics, Bahasa Malaysia and English. The emphases of the curricula are:

- Knowledge acquisition
- Analytical, creative thinking, ability to make decisions and solve problems
- IT competency
- Proficiency in an international language
- Inculcation of moral values which lead to the development of a good citizen

Telekom Malaysia Bhd. leads this pilot project through its subsidiary, Telekom Smart School Sdn. Bhd., together with several other local and international companies. The pilot project which runs for a period of 3 years, costs RM300 million. There are many potential benefits which will accrue from such an enhanced school system. Previously, teaching was mainly associated with telling, writing on black or white boards and the extensive use of textbooks. Now, teaching materials consist of multimedia softwares and coursewares such as CD-ROMs. These new digital teaching materials incorporate multimedia elements -- sounds, graphics, animations, etc. Therefore, the learning process becomes more interactive, is three-dimensional and needless to say is more fun. If school computer laboratories are fully utilised, and the ratio of students to computer improves, students will be able to also communicate with international peers and teachers across the globe. Hence, a new experience of exploration and learning is now made available to local students.

The Smart school project also aims at systematic change in the national education system, that is, from an examination-oriented culture to one that is a more thinking and creative knowledge-based culture. However, to ensure the success of such a migration to E-learning, it is worthwhile to bear in mind that educational media alone do not influence the

academic achievement of the students. Some reports have shown that the use of technology is a function of the local culture and its capacity for change. Specifically, students in wealthier schools are more likely to use computers to develop higher-order skills, while those in poorer schools use them for repetitious drill-and-practice routines, i.e. to carry out basic tasks instead of doing programming and exploring tool applications. Eventually, without the much needed drive to change, the latter will become passive consumers of electronic information and become trapped in a cycle of under-utilizing the full potential of the available technology. In fact, eventually, they will not be able to compete efficiently and effectively at the tertiary level. This is because the well-trained, ICT-enabled learner, has become more independent, possesses self-discipline and needs only occasional guidance from their teachers. They are well prepared to cope with the challenges of learning in a fast changing borderless tertiary environment.

Although many teachers realize that there are many resources online, they are bogged down with their traditional school responsibilities. At the initial stage of the Smart School project, some teachers may feel intimidated. There will usually be a gestation period for teachers to integrate ICT into their existing curriculum. Teachers are learners as well, as a matter of fact, lifelong learners who need to be familiar with the new hardware, software, and courseware. Some teachers need more assistance to figure out how to integrate ICT into their subjects, especially during the handholding period. They certainly need time, resources and flexibility for making the necessary paradigmatic changes required of them. One of the ways to get support from teachers is by encouraging students, teachers, content developers, publishers and distributors to work together to produce the much needed educational content.

Digital Inclusion Encompasses Effective Usage

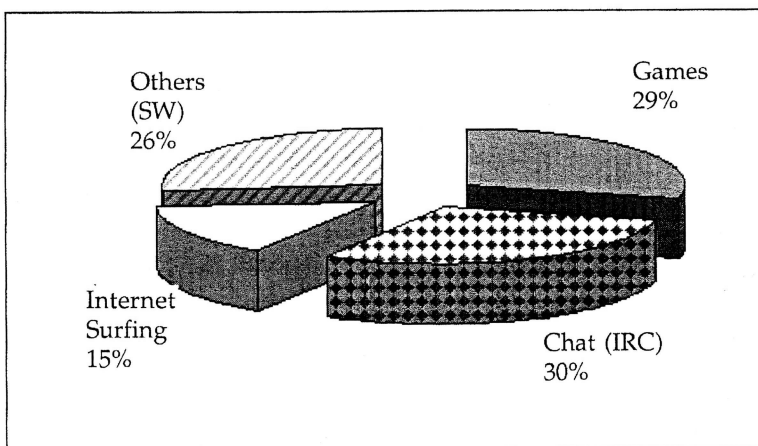
Next, let us discuss the effectiveness of access. The whole exercise of trying to get the people online is meaningless, if there is no further effort to monitor the usage pattern. There will always be people who may not fully appreciate how technology can be optimally deployed as an effective teaching-learning tool. We do not want to encounter another potential major problem later - "cyberlepak". The majority of the children and teenagers are chatting away, and playing computer games at cyber cafes. This usage pattern will spoil the image of cyber cafes, and distract

us from seeing their full potential as "public knowledge centres". That explains why many parents are quite sceptical about the perceived role of cyber cafes, particularly among the elderly. The older they are, the more sceptical they become about the benefits of using the internet.

These current scenarios and statistics point to the need for a "positive use of Internet" programme or "Internet Education" programme. The programmes should encompass awareness and netiquette campaigns, formulations of an Acceptable Use Policy (AUP) and promotion of appropriate technologies to filter or monitor internet usage. According to a recent meeting among ASEAN Telecommunications' Senior Officials (TELSOM), all members of ASEAN countries are currently working on similar efforts or at least looking forward to having this sort of programmes.

Moreover, it is argued that with the introduction and availability of new technological and pedagogical tools there is an urgent need to consider the range of literacies people will have to possess in order to function in the new Digital Age. This problem is most critical for users whose first language is not English, e.g. especially those from the remote areas. Besides, most keyboards and softwares are in English and the information on the internet is predominantly in English and text-based. More than 80% of the current internet content is in English, whereas 70% of readership population in Malaysia is more fluent with Bahasa Malaysia. Therefore, the main issue is: how are these marginalized groups going to acquire global knowledge through ICT?

Figure 5
Usage Pattern in Malaysia



Sumber: Malaysian Online Cyber Cafes (MOLCC).

Other aspects, such as plucking up enough courage to re-skill or re-tool, and the urge to use ICT are critical as well. Some people might foresee that there is little impact the new technologies will have on their economic and social activities and therefore, will not see the importance of having to change with the times, as it were. There are people who are excited about the prospect of exploring the new technologies, but once it does not seem to bring about any significant impact on their lives, they will feel discouraged and not pursue the waning interests any further after a period of time.

Latest, Simple or Customised Technology?

Another issue is about the appropriateness of the technology. Does it suit local conditions, needs and expected use? What do computers mean to local farmers who work on the paddy fields, and who are busy looking after their daily needs and their children? Most likely they prefer to keep their money, even as much as RM 2.00 to buy sugar or fish rather than giving it to their children to surf the net at cyber cafés; a luxury which to their reckoning does not seem to lead to any tangible benefits. Here then, is an opportune time to raise an important issue for consideration -- the role of content developers to really understand the needs of local people who currently have only a little or no inkling at all about the networked economy. Content developers need to create, update and promote content, not merely content in local languages or dialects but also relevant and functional content with practical applications. Types, levels and presentation styles of the content must be compatible with or customised to the end-users writing, reading and language skills requirements as well.

The role of leadership in a village is important. The leader could be the champion of any ICT project in the village. He/she could access the Internet and disseminate the relevant information, such as weather conditions, government subsidies and grants as well as paddy and fertilizer prices conventionally, e.g. by flyers or word of mouth to the other rural folks in the community. Hence, people will learn to appreciate the value of accessibility to quick and current information. With such vital information, the rural folks could avoid being short-changed by middlemen who usually buy their products at unreasonable prices.

It should be borne in mind that the most advanced technology is not necessarily the best for the people, particularly for developing and

underserved areas. Mobile phone penetration, for example is much more diffused. Nonetheless, this fact should be taken positively. The 'Penghulu', for example, can use the SMS to send information to his village folks or can use email if he is more adept at using ICT. Although the number of characters is limited when using the SMS, it is simpler and faster. Therefore, technology companies must firstly define their markets and promote the appropriate products according to local conditions and needs.

Some other people, the upper income group and housewives might not have the time to use PCs and the internet. Housewives might be too occupied with household chores, whereas working parents might be too tired and too busy, what with having to cope with household routines and to spend quality time with their children after work. Other things are more important than to hook up to internet. Therefore, digital inequity might persist because of socio-cultural factors such as gender, occupational status and race. Obviously, the hindering and driving factors are not solely income but also time, attitude and perception. In fact, if technology use becomes an additional burden to people's lives, if it is something they have to add on to their daily routines and responsibilities, they are less likely to welcome it, what more to consider the prospect of adopting the practice.

Other Recommendations

We have heard or read about so many aspects of the issues of digital equity and digital divide. What can be learnt from the existing scenarios described in the foregoing discussion, strategies that have been put in place to address the issue, and their impacts on the target groups? What does the Government have in mind for future improvements, or what else can be done, and urgently?

Most government agencies involved are providing the facilities and services free of charge. Internet users do not have to pay user charges compared to those in the privately operated cyber cafes. This model means that the government has to subsidize the initial and operational costs. Grants, donations and philanthropic programs have demonstrated the useful application of technology among underserved populations, but in many cases they have failed to produce sustainable, and widely replicable models. Therefore, the current model is being reviewed.

An alternative model, which incorporates the subsidy element and business model, could provide a more sustainable long-term solution. A technology partner can be appointed to run and monitor the ICT centres, and to provide the relevant training (ICT and non-ICT related, depending on needs). Users, however, are charged minimal fees as the infrastructure (computer and network facilities) is being subsidized and sponsored by other partners. The centres could also offer PC maintenance services and sell PC equipment and tools (new and refurbished). The earnings from internet, PC charges, training, ICT equipment and services are later shared by the partners to finance the operational and maintenance costs. The community, as the target group, will review the needs and gather the feedback from the current and potential users from time to time. This proposed model supports the community's educational and economic needs. This model will be able to address the many aspects of digital equity or digital divide that we have mentioned previously.

There should be continuous awareness programmes about the extent and dimensions of the divide not only for the community and policy makers, but also to industry so that the industry players can identify specific areas of product development, marketing and promotion.

There should be more software developers to develop products with more non-textual representations in local and minority languages, and for teaching English as a second language. The latter is also in line with the Government's initiative to introduce Science and Mathematics in English in both primary and secondary schools. This could be one of the focused areas of the Content Development Fund, administered by the Ministry of Energy, Communications and Multimedia.

At the same time, the Government could continue to promote the concept of corporate social responsibility within the IT industry so as to raise awareness and involvement, particularly in rural and underserved communities. Besides the range of subsidies and tax incentives, there could be other long-term business opportunities within a tri-partite model (Government-corporate sector and target community). Hence, the corporate sector is more interested to be involved in such community relations project.

Councils and local authorities should develop or promote plans to fully utilize resources available within the community such as schools and

community halls. Through such a collaborative effort, there is the potential of providing free or inexpensive access and training. Private individuals provided such subsidized costs could run these shared and public facilities during weekends and school holidays.

As a monitoring tool, there is a need to develop a more comprehensive metric or measure for tracking the 'real divides' and stimulate discussions on the various pressing issues and, hopefully these will facilitate policy formulation and the adoption of regulatory frameworks, as well as strategic improvements. At the same time, there must be more effort to promote publications highlighting best practices and success stories on digital equity so that the available minimal resources are well deployed.

CONCLUSION

There is no overnight solution to gain digital equity in any country. A single nation could never overcome the digital gap issues without cooperation and commitment from community members. An understanding of real needs, implementation issues and appropriate and relevant solutions is critical to reduce the digital gap within the various community layers. The public and private sectors, and the community itself must work hand in glove towards achieving a digital equity. It is our hope that we do not have to reinvent the wheel by learning from our neighbours within ASEAN and other countries such as Thailand and India. In fact, we could showcase to the world the best model of digital equity given our multi-ethnic society and diversified economic base.

ENDNOTES

1. For detail, please contact solehah@ktkm.gov.my
2. Details are by contacting Wckang@mimos.my

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